OIPE
APR 1 6 2004
PATENT & TRADEMARK OFFICE
TC1113

FIG.1

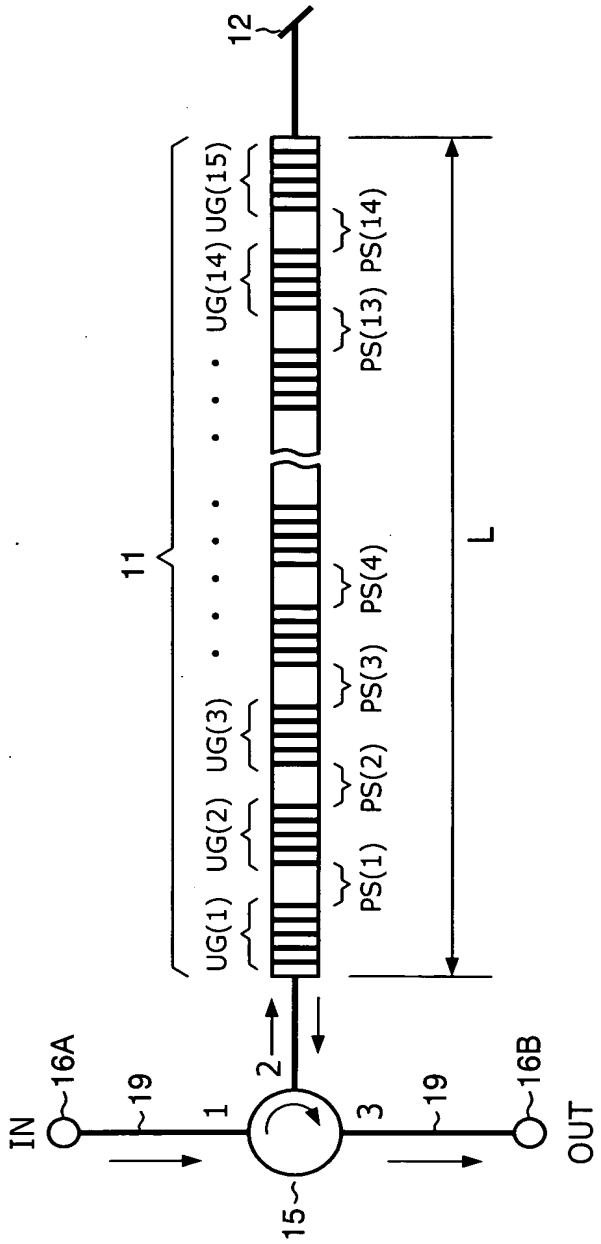


FIG.2

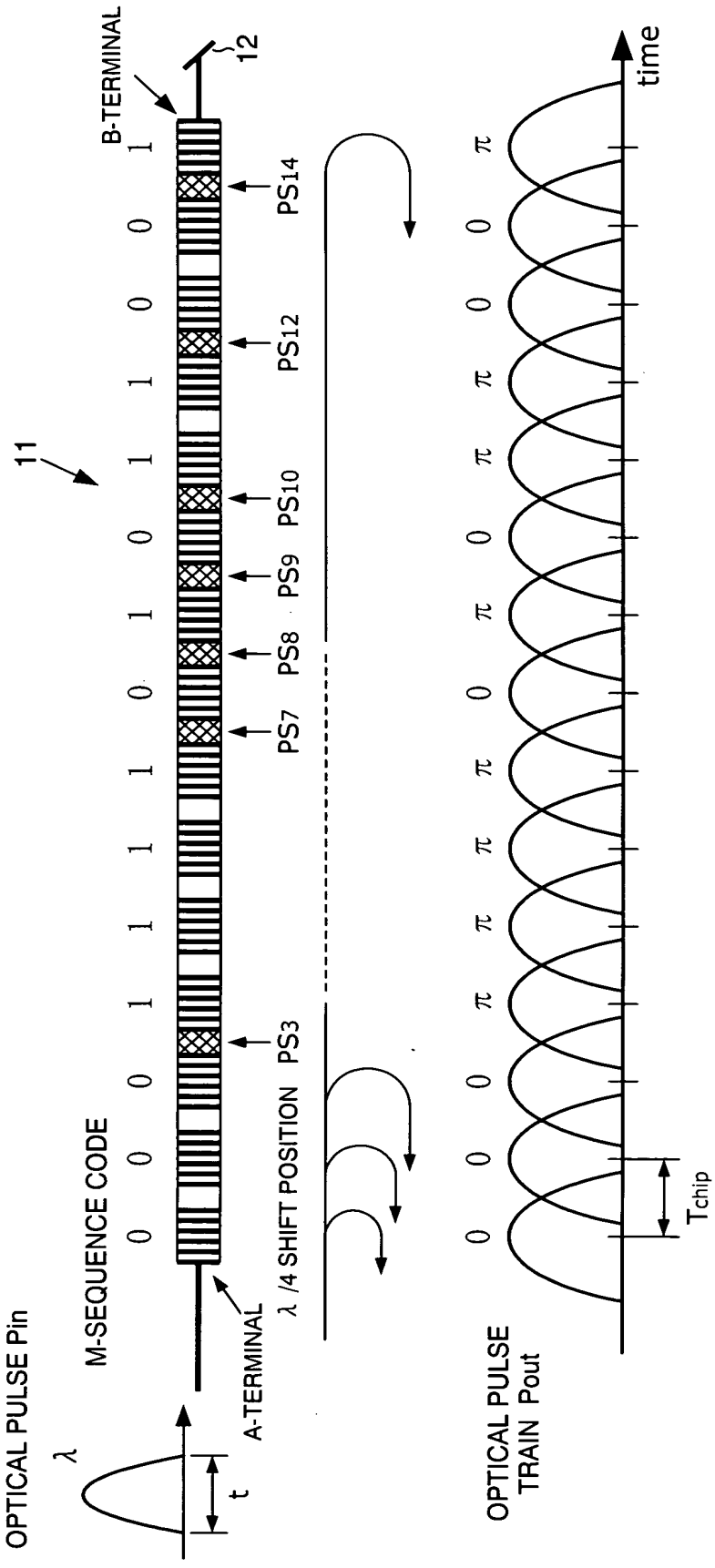

OPTICAL PULSE Pin
λ
t
A-TERMINAL
M-SEQUENCE CODE
0 0 0 0 1 1 1 1 1 0 1 0 1 1 1 0 0 1
11
B-TERMINAL
12
PS3
PS7
PS8
PS9
PS10
PS12
PS14
λ /4 SHIFT POSITION
OPTICAL PULSE TRAIN Pout
0 0 0 0 π π π π π 0 π 0 π π π 0 0 π
time
Tchip

FIG.3

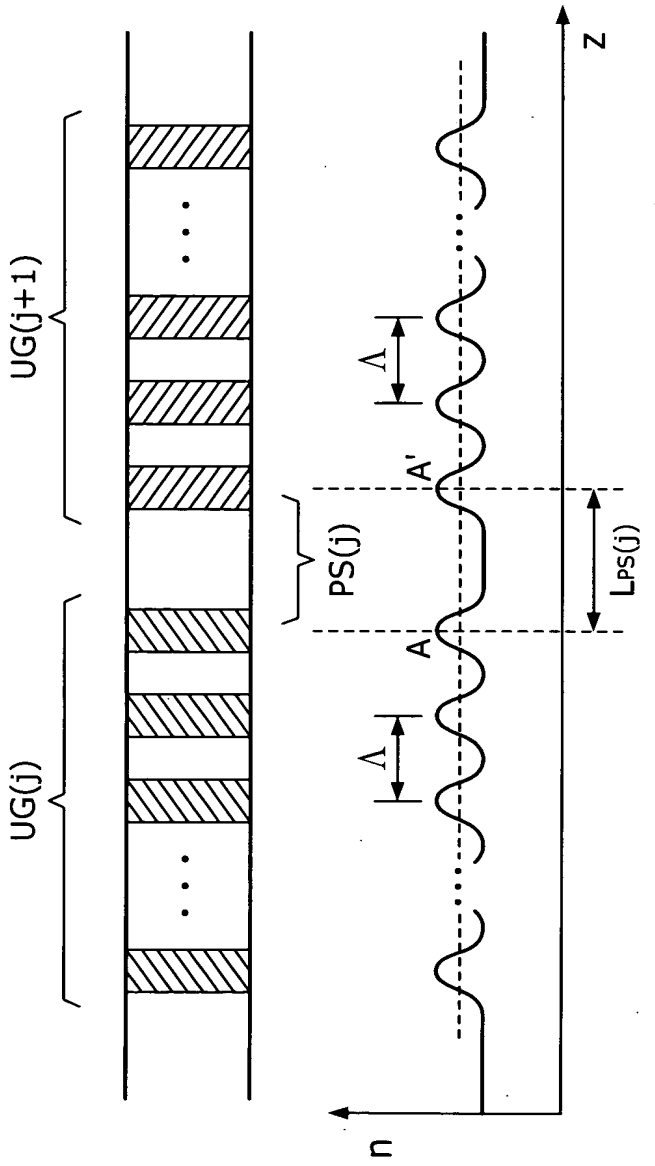


FIG.4

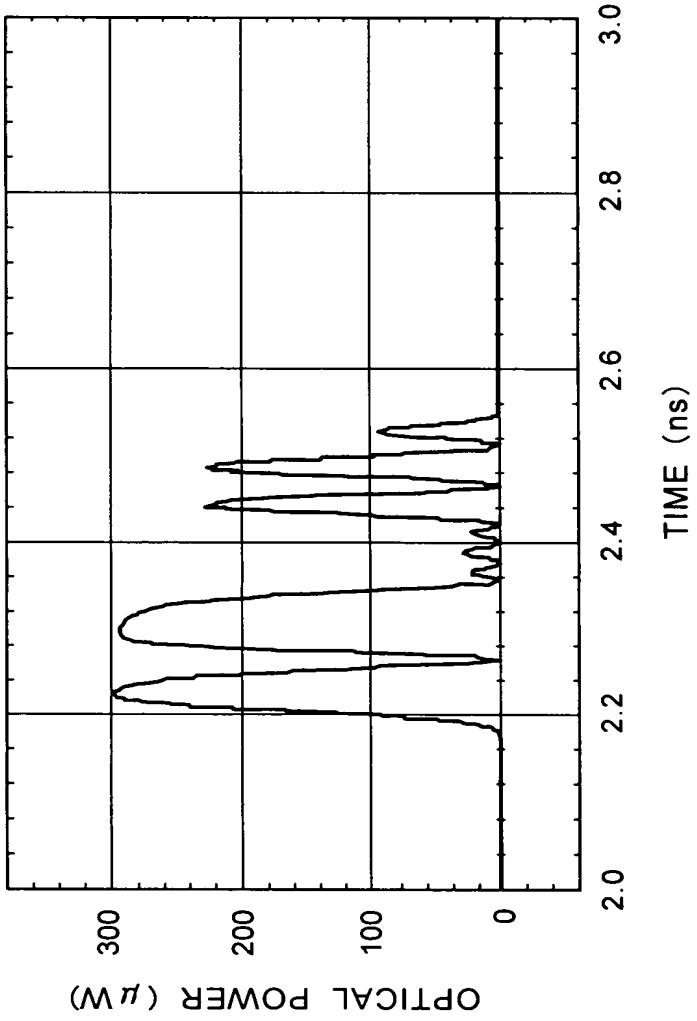


FIG.5

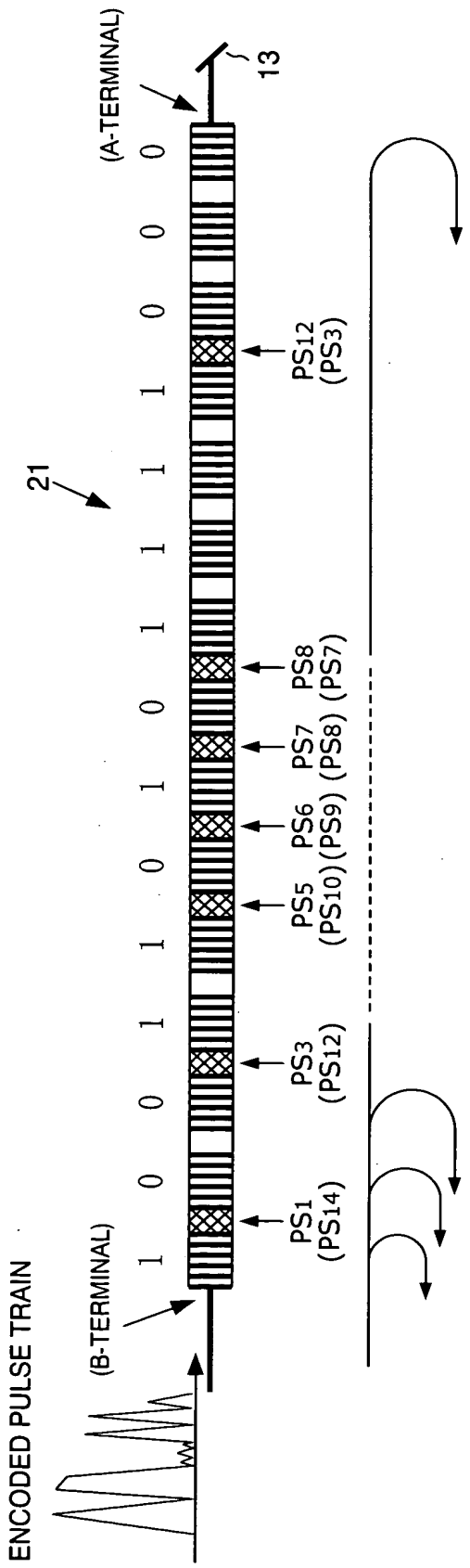

ENCODED PULSE TRAIN
(B-TERMINAL)
(A-TERMINAL)
13
21
1 0 0 0 1 1 1 1 0 1 1 1 0 0 0 0
PS1 (PS14)
PS3 (PS12)
PS5 (PS10)
PS6 (PS9)
PS7 (PS8)
PS8 (PS7)
PS12 (PS3)

FIG.6

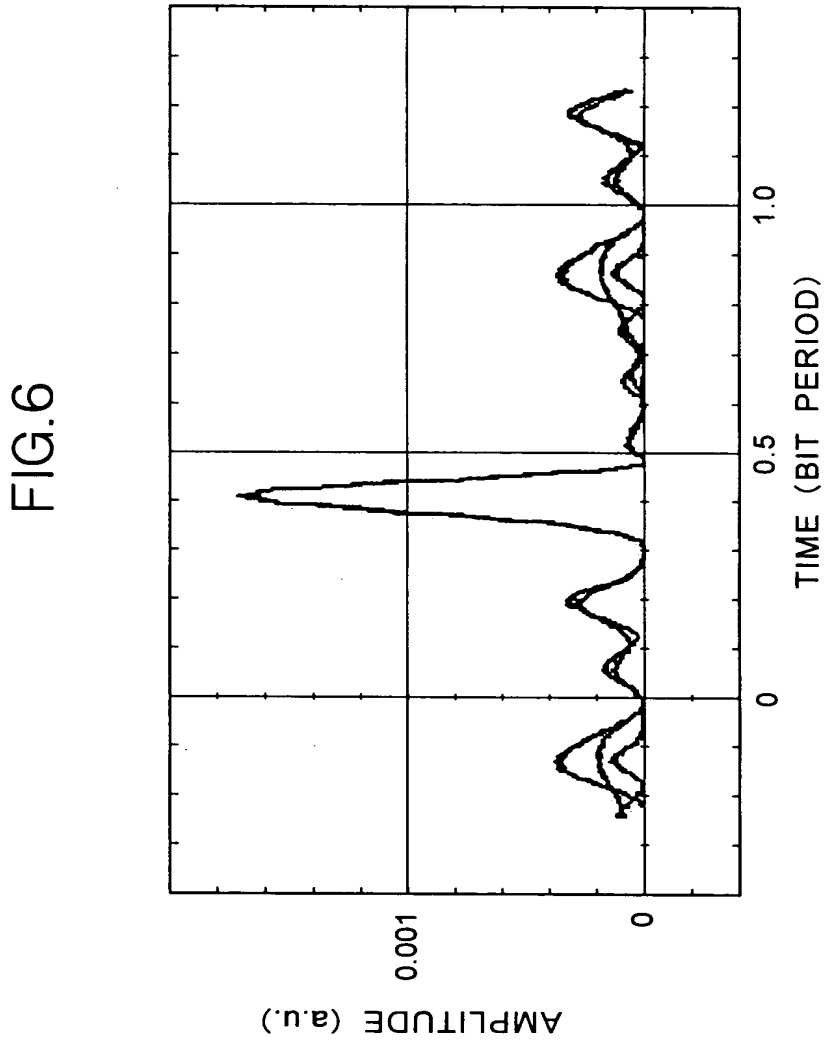


FIG.7

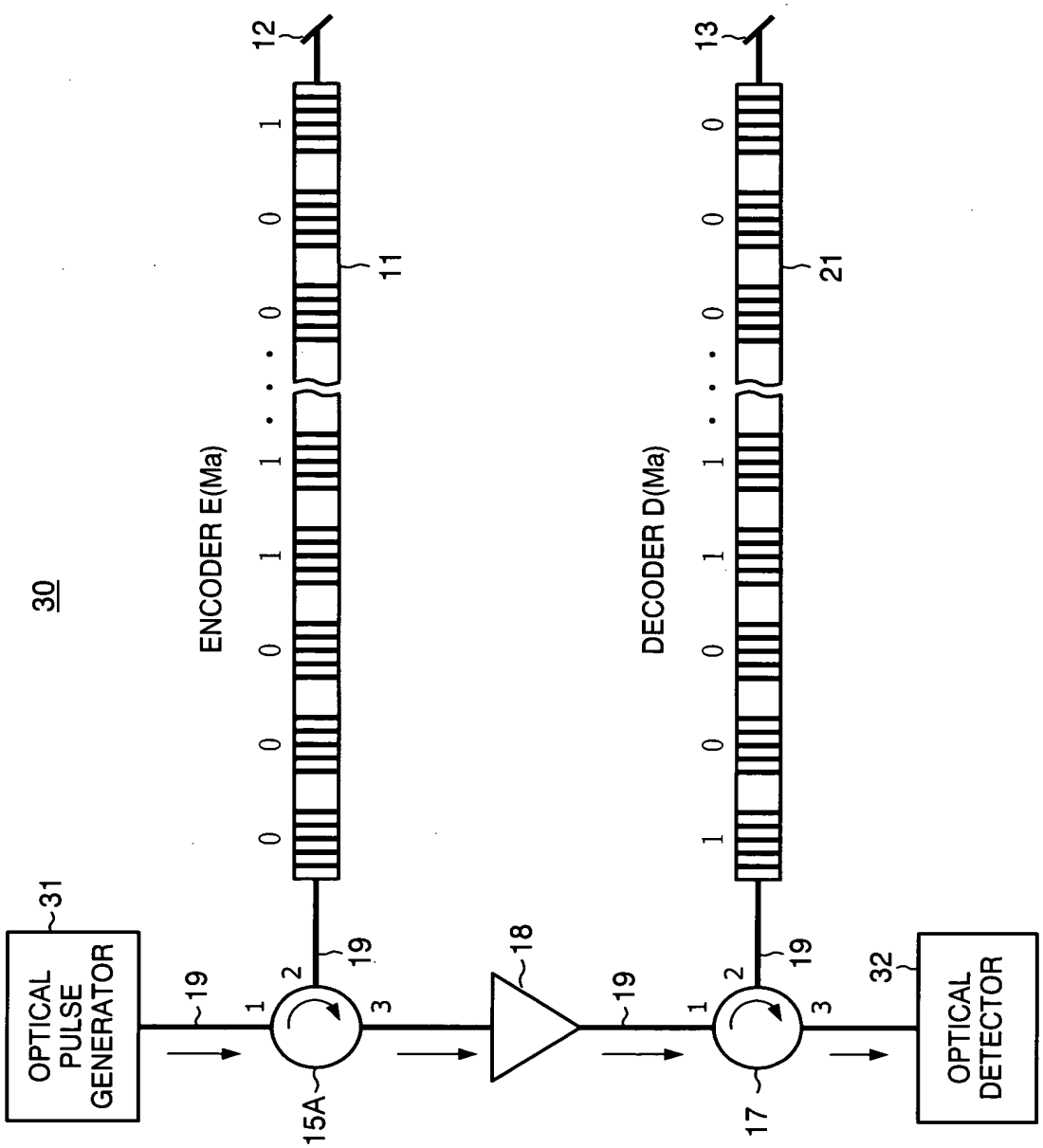

30
ENCODER E(Ma)
DECODER D(Ma)
OPTICAL PULSE GENERATOR
OPTICAL DETECTOR
31
32
11
12
13
15A
17
18
19
21
0 0 0 1 1 . . . 1 0
1 0 0 1 1 . . . 0 0
1
2
3

FIG.8A

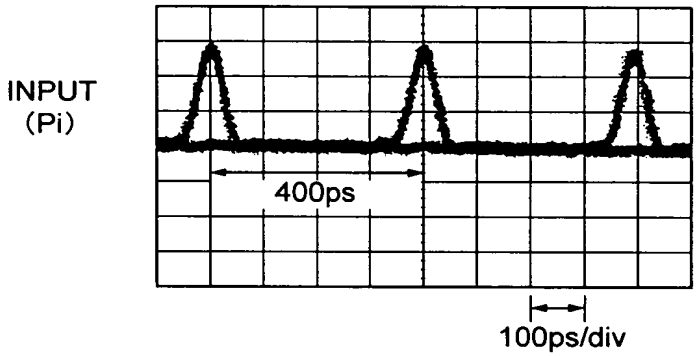


FIG.8B

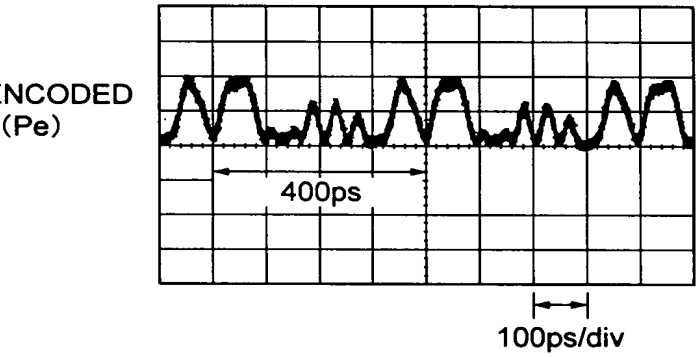


FIG.8C

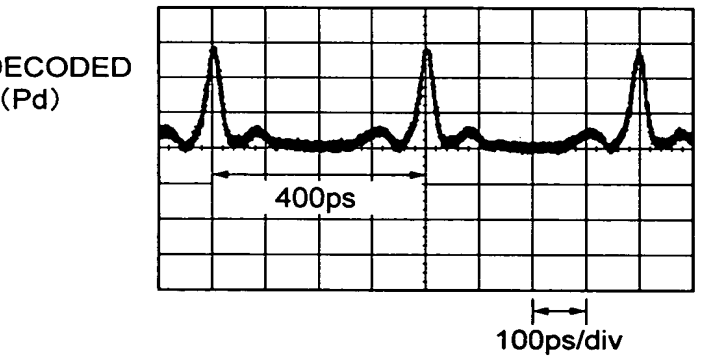


FIG.9

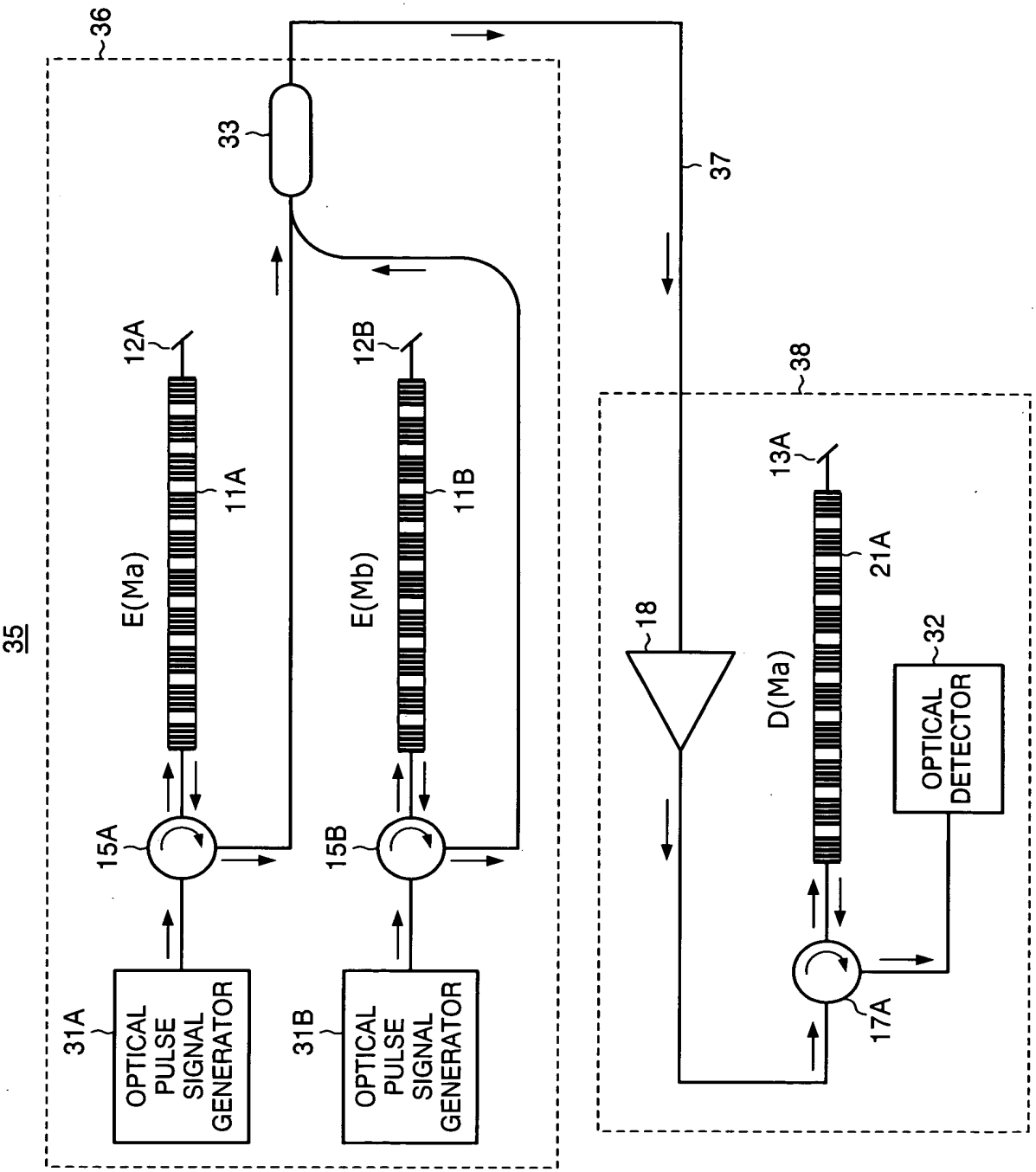

35
36
33
37
38
12A
12B
11A
11B
E(Ma)
E(Mb)
15A
15B
31A
31B
OPTICAL PULSE SIGNAL GENERATOR
OPTICAL PULSE SIGNAL GENERATOR
18
13A
21A
D(Ma)
32
OPTICAL DETECTOR
17A

FIG.10

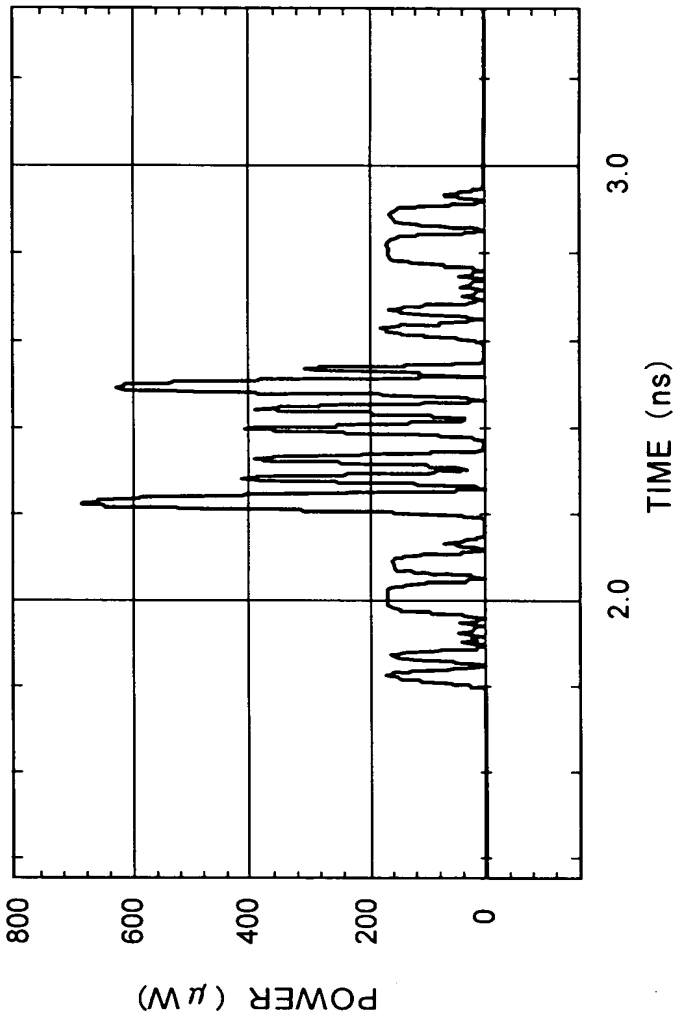


FIG.11

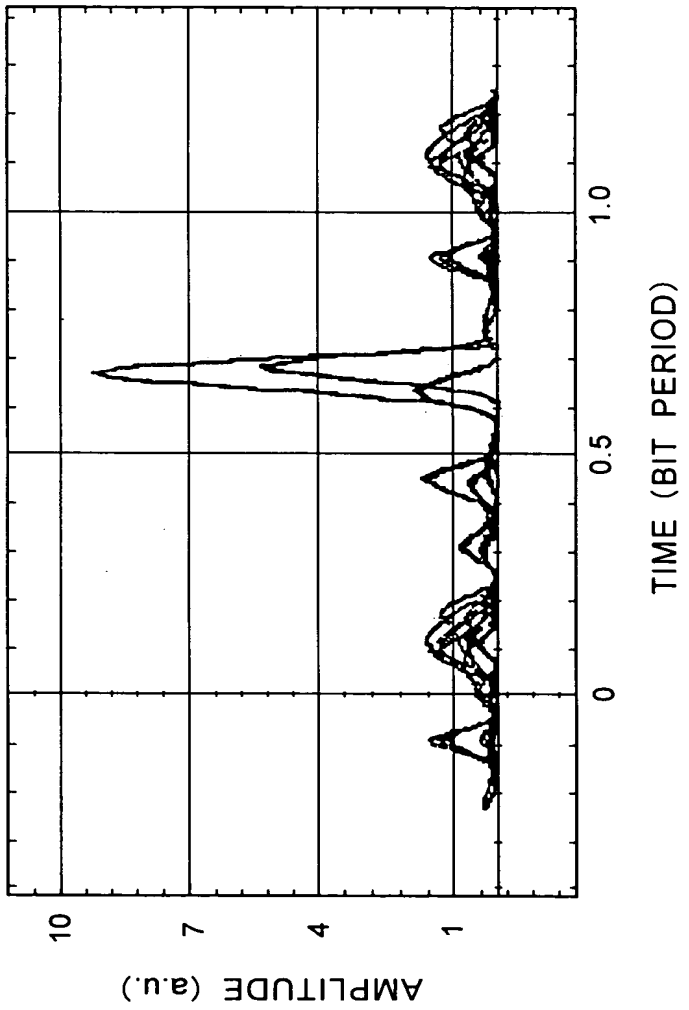


FIG.12

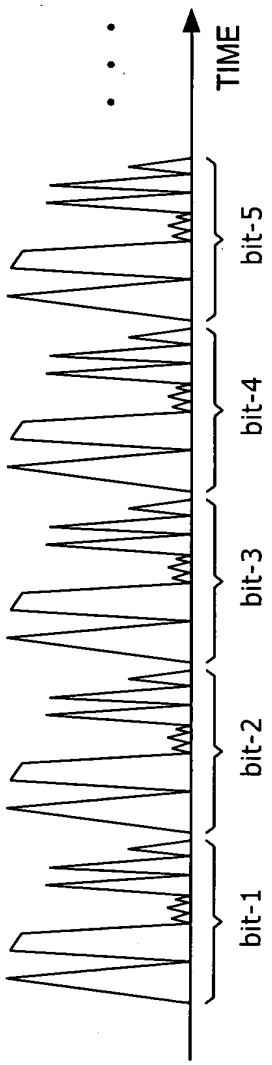


FIG.13

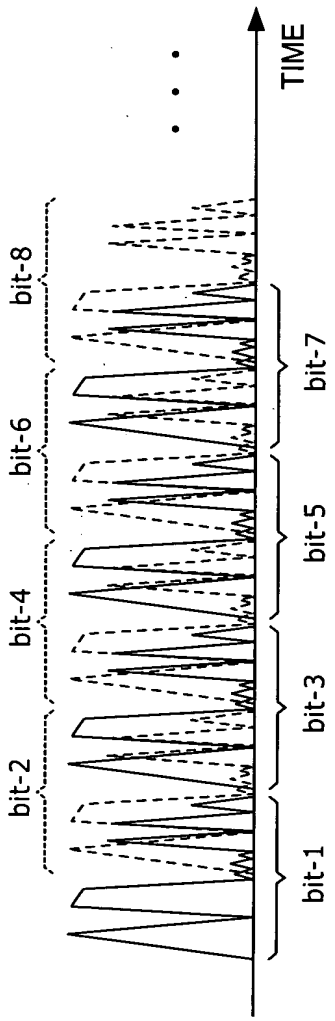


FIG. 14A

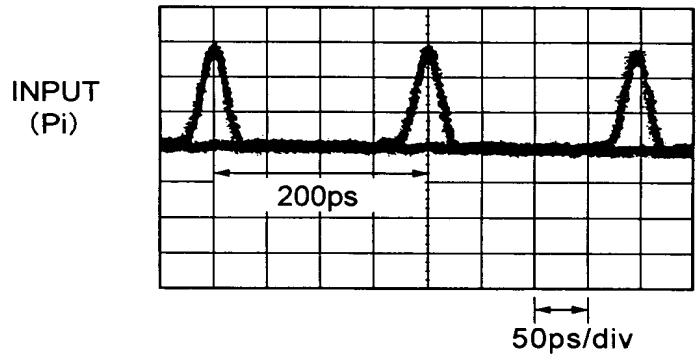


FIG. 14B

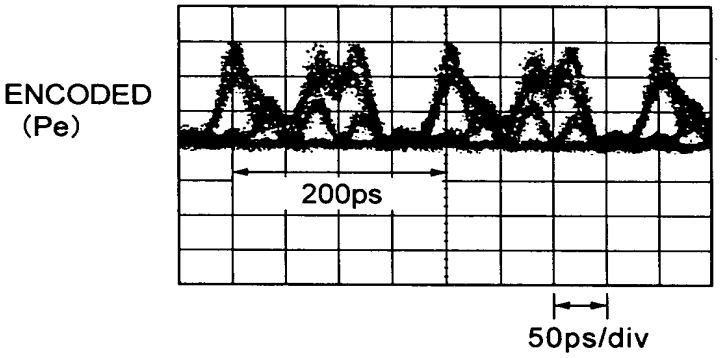


FIG. 14C

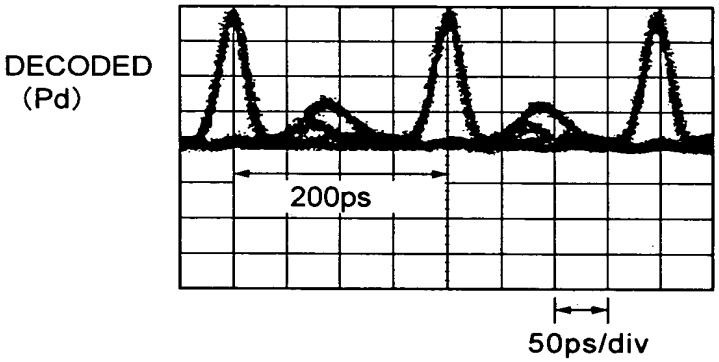


FIG.15

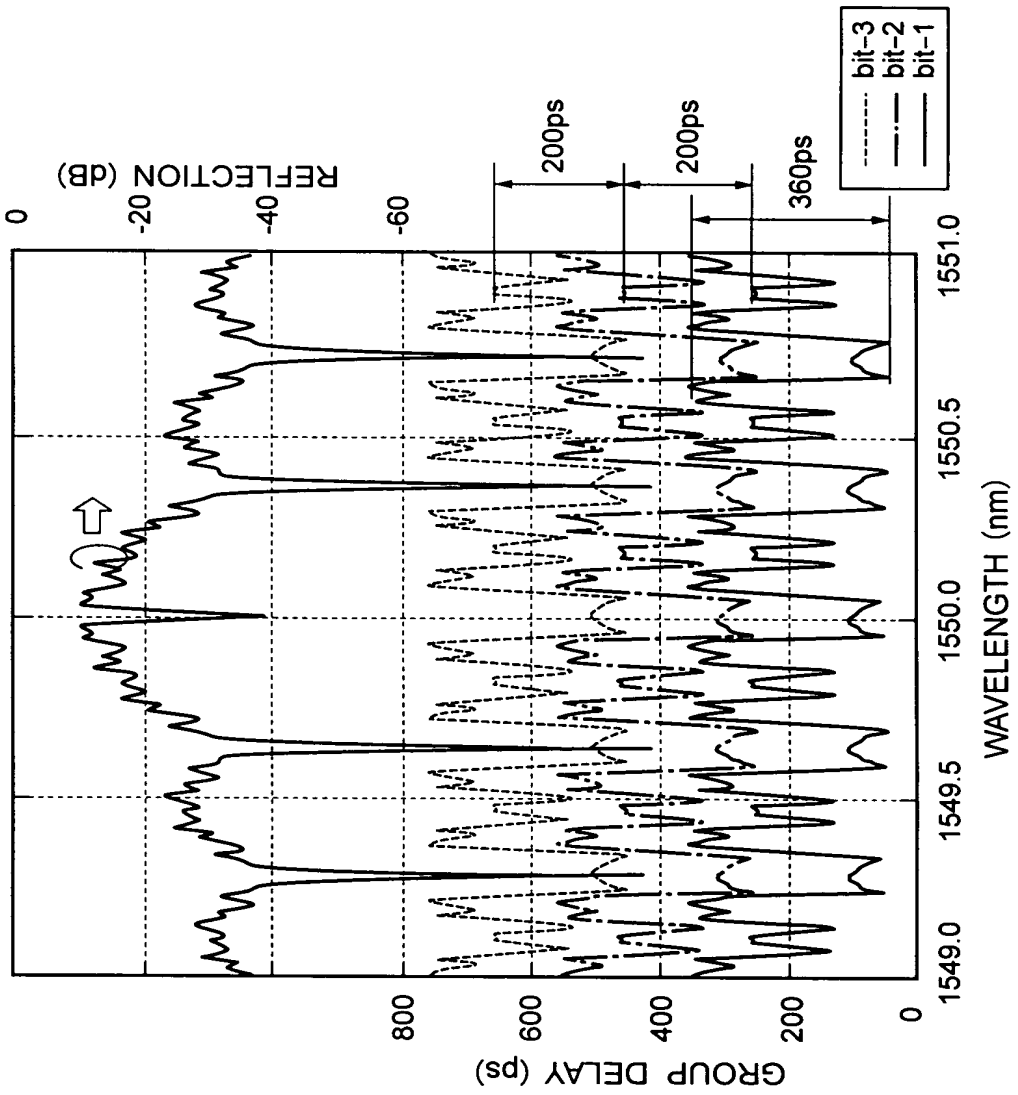

REFLECTION (dB)
0
-20
-40
-60
GROUP DELAY (ps)
800
600
400
200
0
WAVELENGTH (nm)
1549.0
1549.5
1550.0
1550.5
1551.0
200ps
200ps
360ps
bit-3
bit-2
bit-1

FIG.16

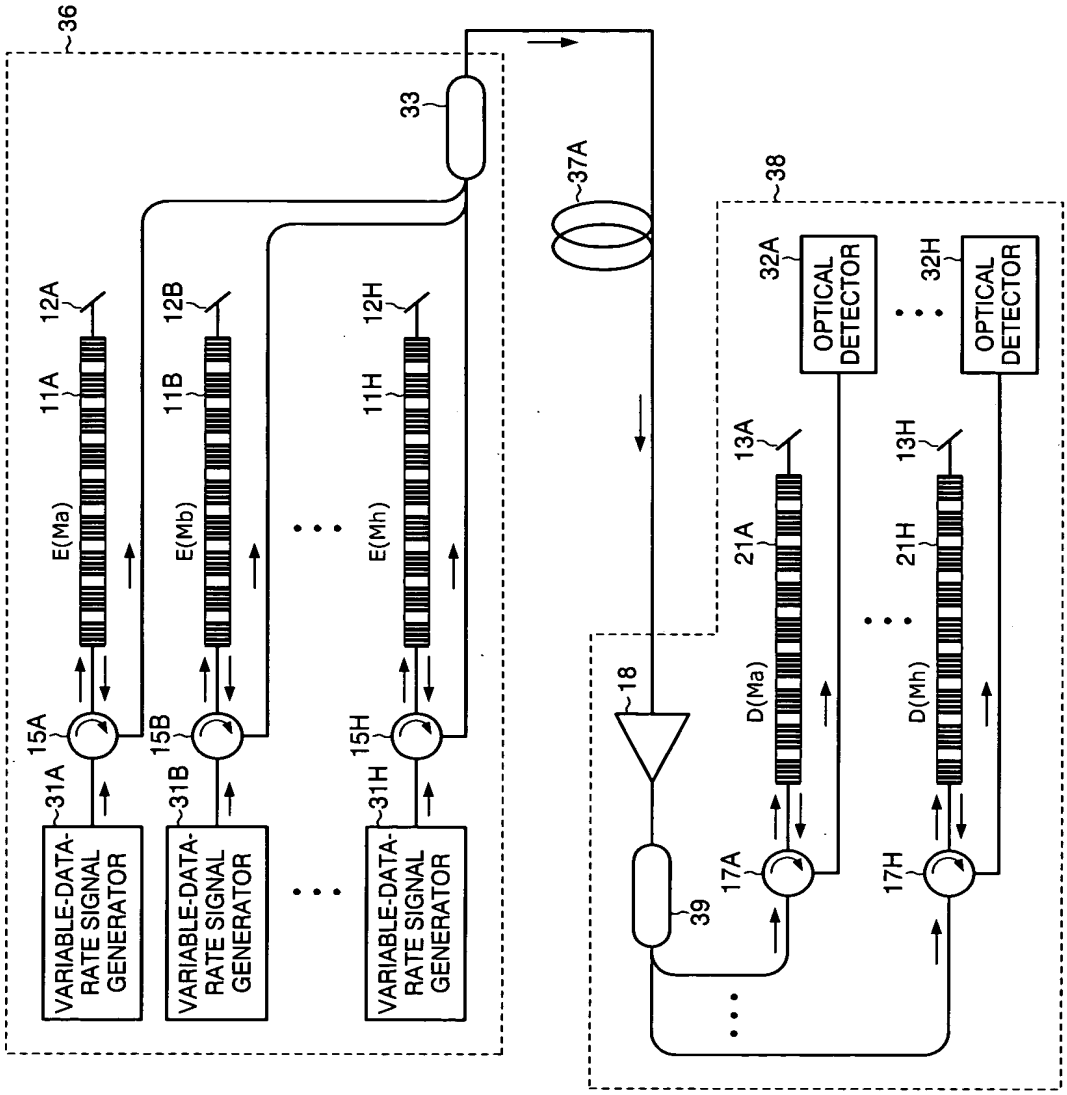

35
36
33
37A
38
VARIABLE-DATA-RATE SIGNAL GENERATOR
VARIABLE-DATA-RATE SIGNAL GENERATOR
VARIABLE-DATA-RATE SIGNAL GENERATOR
31A
31B
31H
15A
15B
15H
12A
12B
12H
11A
11B
11H
E(Ma)
E(Mb)
E(Mh)
18
39
17A
17H
13A
13H
21A
21H
D(Ma)
D(Mh)
32A
32H
OPTICAL DETECTOR
OPTICAL DETECTOR

FIG.17

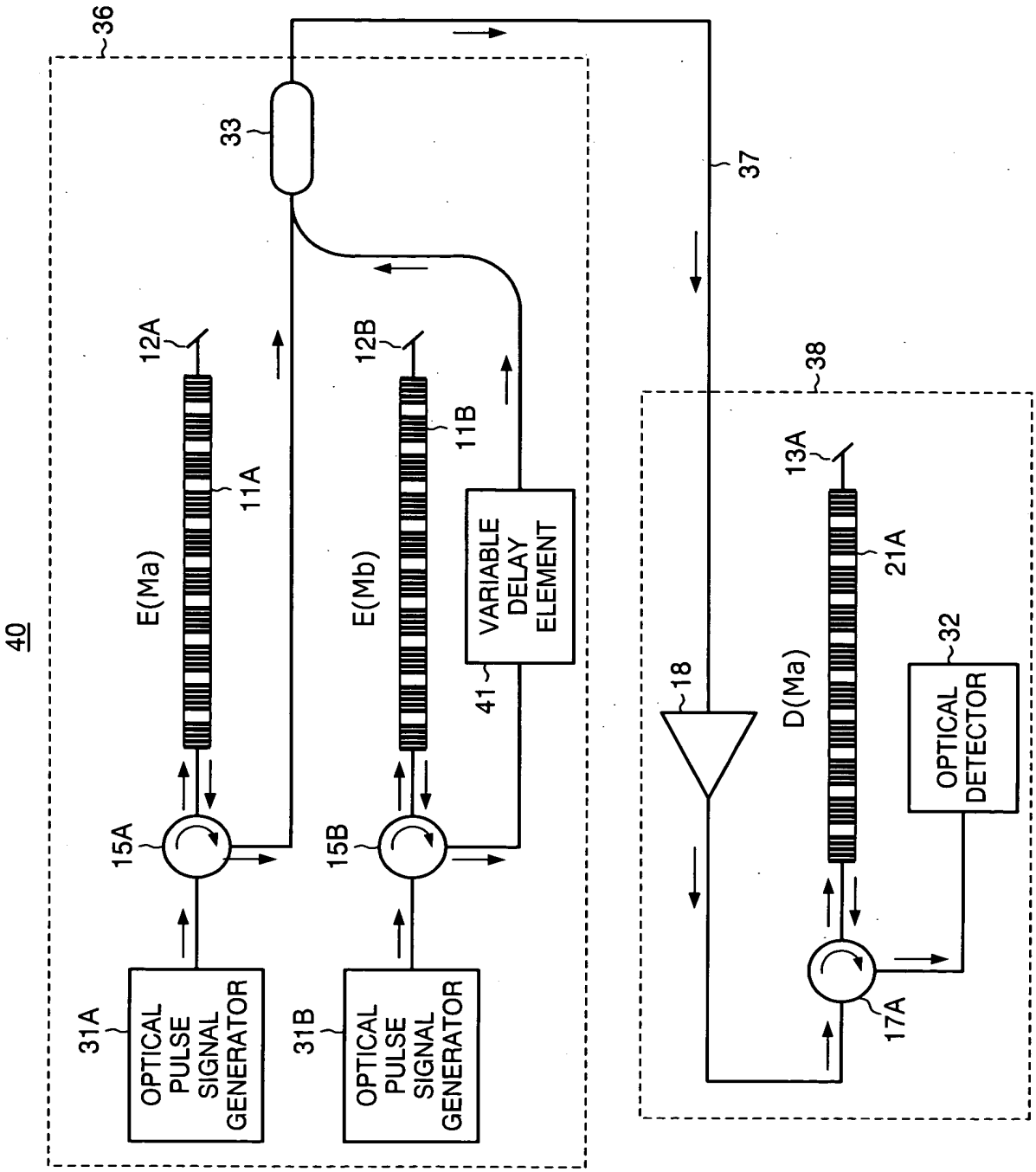

40
36
33
37
38
12A
12B
11A
11B
E(Ma)
E(Mb)
VARIABLE DELAY ELEMENT
41
15A
15B
31A
31B
OPTICAL PULSE SIGNAL GENERATOR
OPTICAL PULSE SIGNAL GENERATOR
18
13A
21A
D(Ma)
32
OPTICAL DETECTOR
17A

FIG. 18

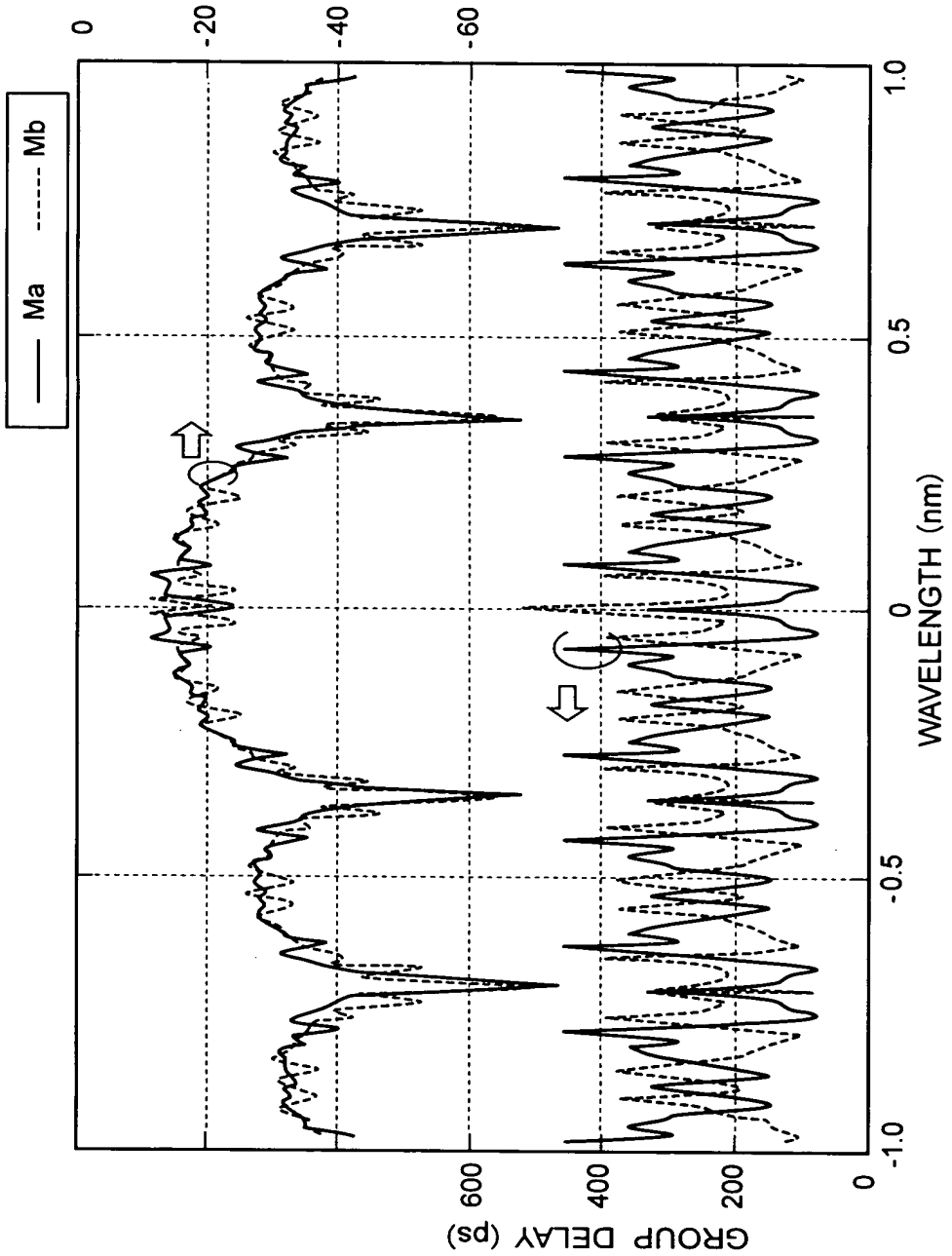

Ma
Mb
0
-20
-40
-60
600
400
200
0
GROUP DELAY (ps)
1.0
0.5
0
-0.5
-1.0
WAVELENGTH (nm)

FIG.19

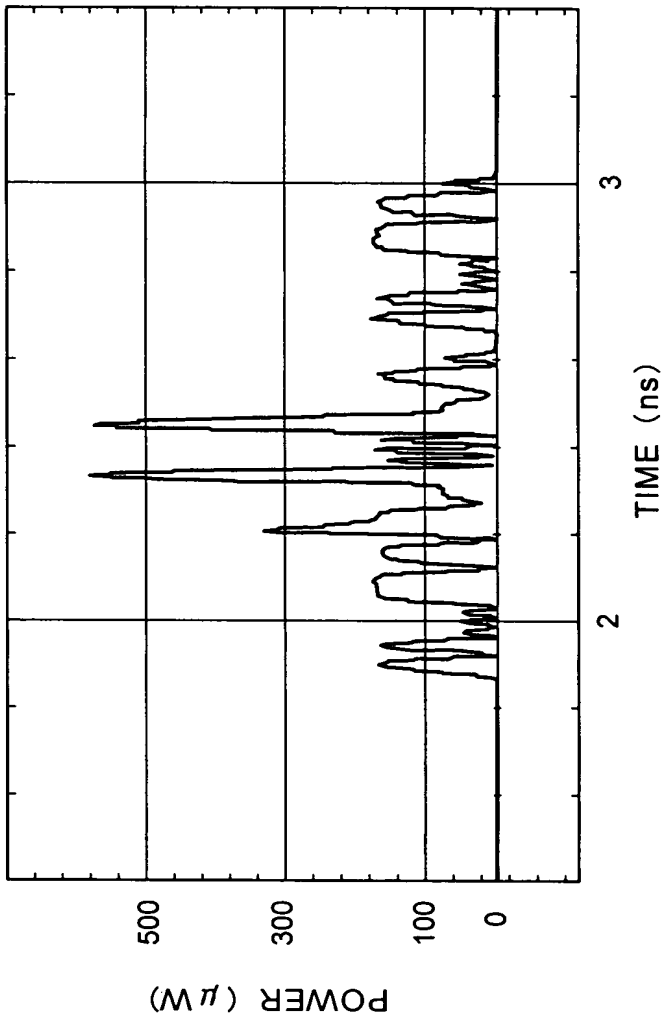


FIG.20

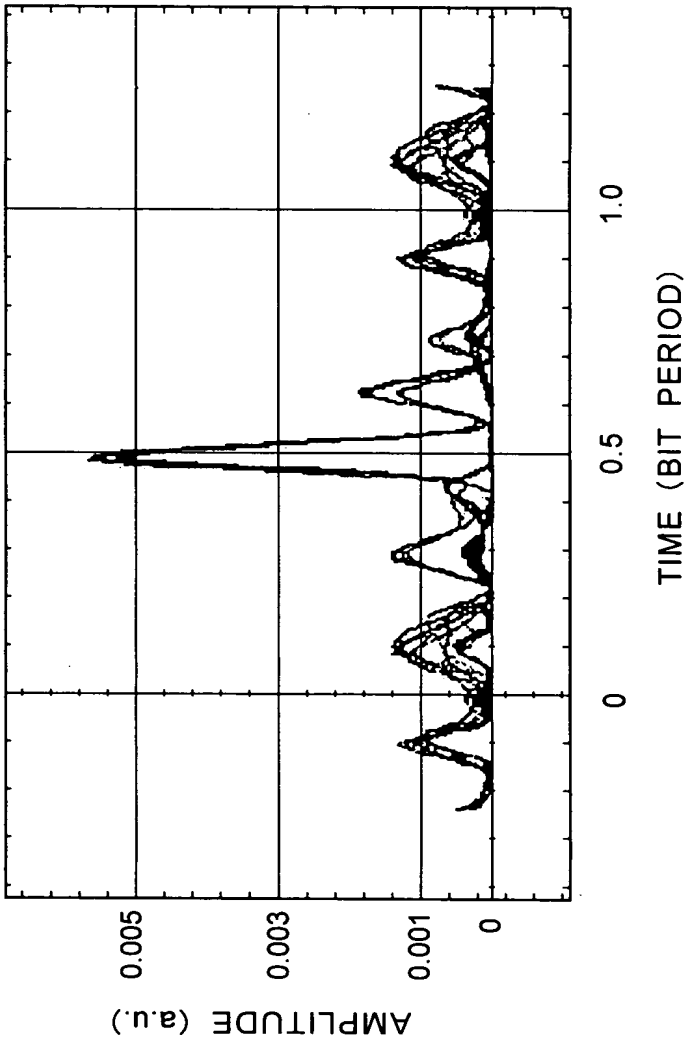


FIG.21

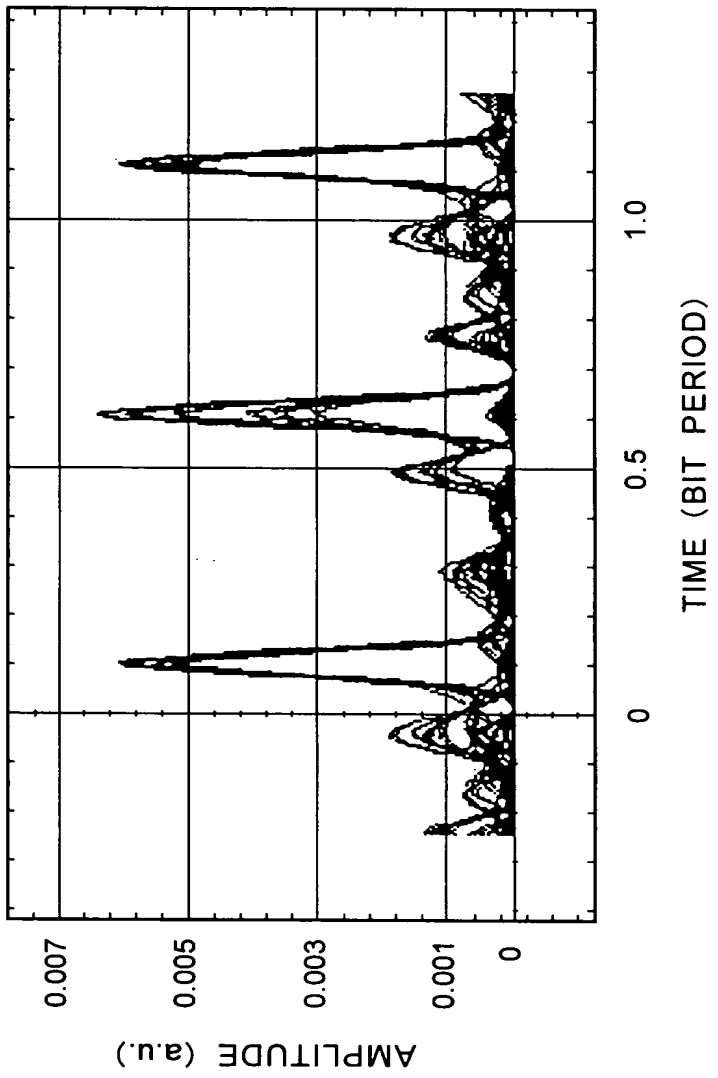


FIG.22

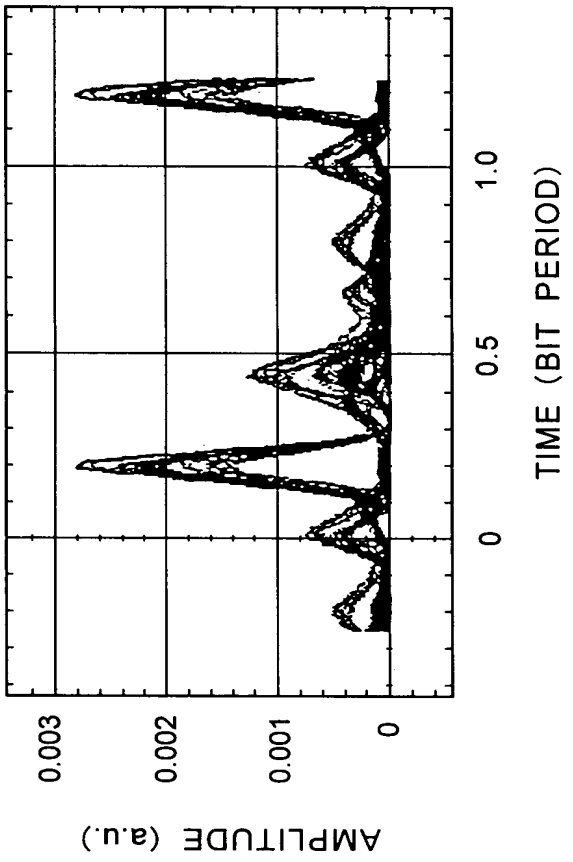
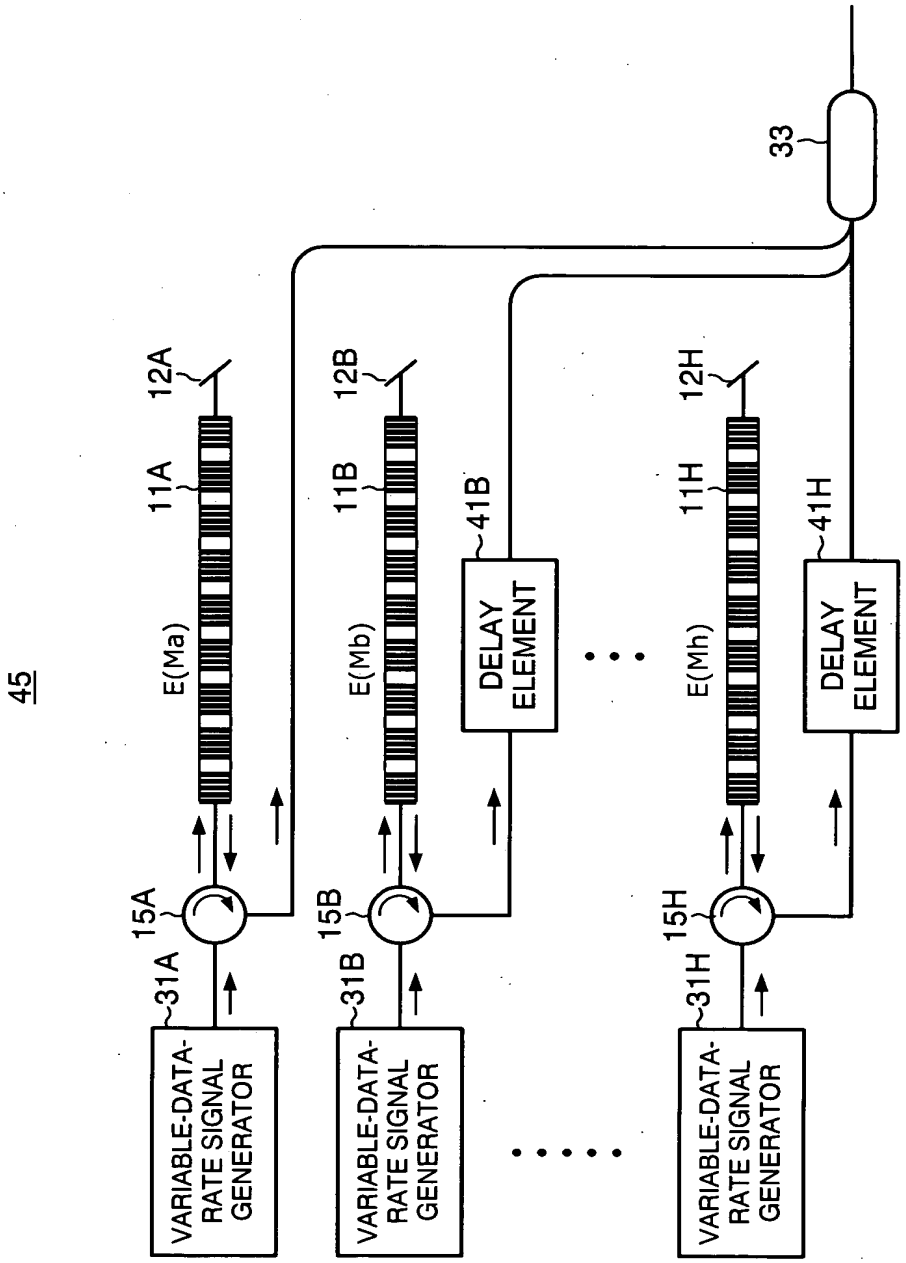


FIG.23


45
33
12A
11A
E(Ma)
15A
31A
VARIABLE-DATA-RATE SIGNAL GENERATOR
12B
11B
E(Mb)
41B
DELAY ELEMENT
15B
31B
VARIABLE-DATA-RATE SIGNAL GENERATOR
12H
11H
E(Mh)
41H
DELAY ELEMENT
15H
31H
VARIABLE-DATA-RATE SIGNAL GENERATOR